
***DecisionSpace® Drilling
Analytics
Release 5000.1.0.0***

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Broader Understanding., Depth Team, Depth Team Explorer, Depth Team Express, Depth Team Extreme, Depth Team Interpreter, DepthTeam, DepthTeam Explorer, DepthTeam Express, DepthTeam Extreme, DepthTeam Interpreter, Desktop Navigator, DESKTOP-PVT, DESKTOP-VIP, DEX, DIMS, Discovery, Discovery 3D, Discovery Asset, Discovery Framebuilder, Discovery PowerStation, Discovery Suite, DMS, Drillability Suite, Drilling Desktop, DrillModel, DrillNET, Drill-to-the-Earth-Model, Drillworks, Drillworks ConnectML, Drillworks Predict, DSS, Dynamic Frameworks to Fill, Dynamic Reservoir Management, Dynamic Surveillance System, EDM, EDM AutoSync, EDT, eLandmark, Engineer's Data Model, Engineer's Desktop, Engineer's Link, ENGINEERING NOTES, eNotes, ESP, Event Similarity Prediction, ezFault, ezModel, ezSurface, ezTracker, ezTracker2D, ezValidator, FastTrack, Field Scenario Planner, FieldPlan, For Production, FrameBuilder, Frameworks to Fill, FZAP!, GeoAtlas, GeoDataLoad, GeoGraphix, GeoGraphix Exploration System, Geologic Interpretation Component, Geometric Kernel, GeoProbe, GeoProbe GF DataServer, GeoSmith, GES, GES97, GesFull, GESXplorer, GMAplus, GMI Imager, Grid3D, GRIDGENR, H. 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DecisionSpace® Drilling Analytics

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DecisionSpace® Drilling Analytics Application

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Chapter 1

Introduction

The DecisionSpace® Drilling Analytics application is an easy-to-use, web-based, business-intelligence tool for historical drilling data analysis and visualization, thus providing a powerful domain-focused analytics tool for drilling. Built to access Landmark's Engineer's Data Model™ (EDM) out of the box, but also fully customizable, DecisionSpace® Drilling Analytics software gives engineers and managers instant insight into their data through a series of analytic models based around common drilling and well engineering issues. These models allow users to quickly and easily compare many attributes across large numbers of wells in various graphical forms, including multiple interactive filtering, without ever having to write a database query. Leveraging this historical drilling data is critical to optimizing newer drilling operations.

The DecisionSpace® Drilling Analytics application comes with 18 pre-packed analyses in the release 5000.1.0.0, which will work out of the box with EDM database. Additional analysis that are client-specific can be easily created from scratch or by reusing components from the pre-loaded models. The DecisionSpace® Drilling Analytics application enables easy access to data, promotes effective decision-making, and enables engineers to analyze any type of information and benchmark best and worst performing part, partners, and process.

Upon completion of this course, administrators and users should have a firm understanding of how to create a completely new analysis using existing components, create a new analysis from scratch, and how to use the analysis designer to make changes and interpret data. This manual is also accompanied by a set of hands-on exercises that attendees can use to practice the concepts learned in the course.

DecisionSpace® Drilling Analytics Application Overview

The DecisionSpace® Drilling Analytics application 5000.1.0.0 training course is intended to provide you with the necessary knowledge to effectively interpret and analyze existing analyses as well as create new analyses with data in the EDM database using the DecisionSpace® Drilling Analytics application.

After completing this course, you will be able to:

- Navigate the DecisionSpace® Drilling Analytics application
- Identify the different components
- Display different types of graphical results and filter the data set
- Customize the existing analysis and fields
- Create a new analysis from existing analyses
- Create a new analysis from scratch using EDM database
- Troubleshoot issues related to the application

DecisionSpace® Drilling Analytics Application

Chapter 2

Overview

In this chapter, you will learn to:

- ☐ Navigate the DecisionSpace® Drilling Analytics application
- ☐ Identify the different components

What is the DecisionSpace® Drilling Analytics Application?

DecisionSpace Drilling Analytics (DSDA) is a web-based, business-intelligence tool used for historical drilling data analysis and visualization. It is built on the EDM and is fully customizable and can be used to optimize planning of new wells, benchmarking, and Data QC. DSDA 5000.1.0.0 release comes with 18 pre-defined analyses and also provides you with tools to build your own analyses.

DSDA includes an interactive ESRI-based mapping selection and filtering feature. Its web-based interface enables you to access analyses from anywhere. DSDA provides efficient access to all the data sets contained within EDM applications.

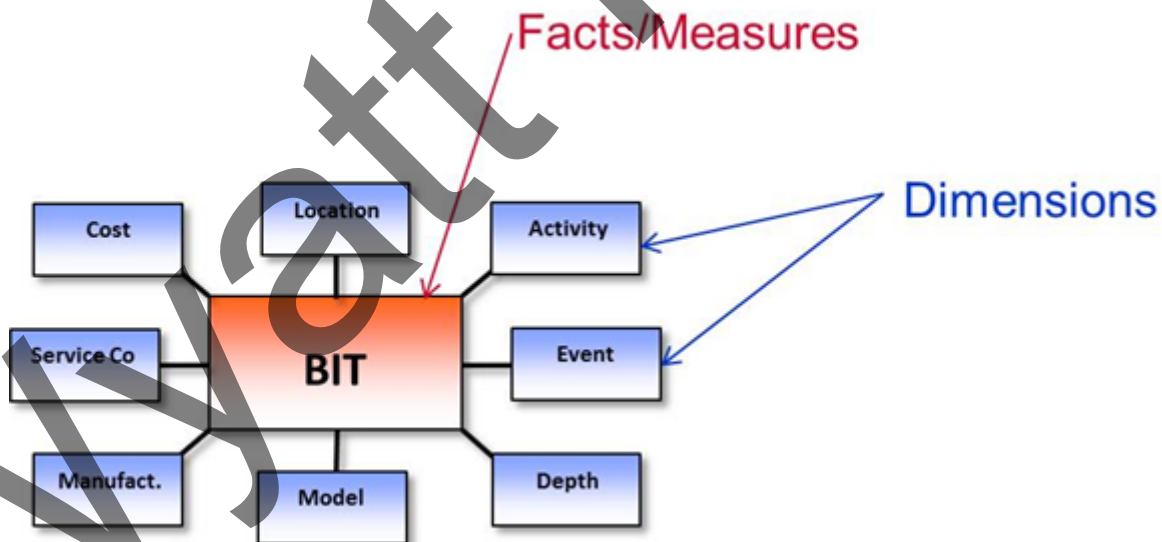
Feature	Description
Analyses	The core of DecisionSpace Drilling Analytics is its set of Analyses. Each analysis is a business-intelligence data model (or OLAP cube), which contains a set of related drilling data focused on a specific drilling or engineering area of interest.
Browser-Based Interface	DecisionSpace Drilling Analytics is built on a web-based interface allowing you to access your analyses from anywhere. The web interface can be used on any operating system with a current generation browser. Supported platforms are listed in the DecisionSpace Drilling Analytics Installation Guide.
Charts and Plots	DecisionSpace Drilling Analytics provides a wide range of chart types for visualizing drilling data in an engineering database. The graphics engine is intuitive and fast. Visualizations are completely interactive. Changes in data selection criteria are immediately reflected across all displayed charts.
Customization	DecisionSpace Drilling Analytics is fully customizable. You can modify existing analyses, join data from other sources, such as Excel or relational databases, and you can create your own analyses from the ground up using the Analysis Designer.
Mapping	Wellbores can be interactively selected using ESRI-based mapping selections and filters. The map interface lets you define search area's geographic boundaries to find wellbores. You can also set up one or more filters to find data based on engineering, geological, or equipment parameters. More information about the wellbore is available via lists and pop-up windows.

The DecisionSpace® Drilling Analytics Application and the EDM Database

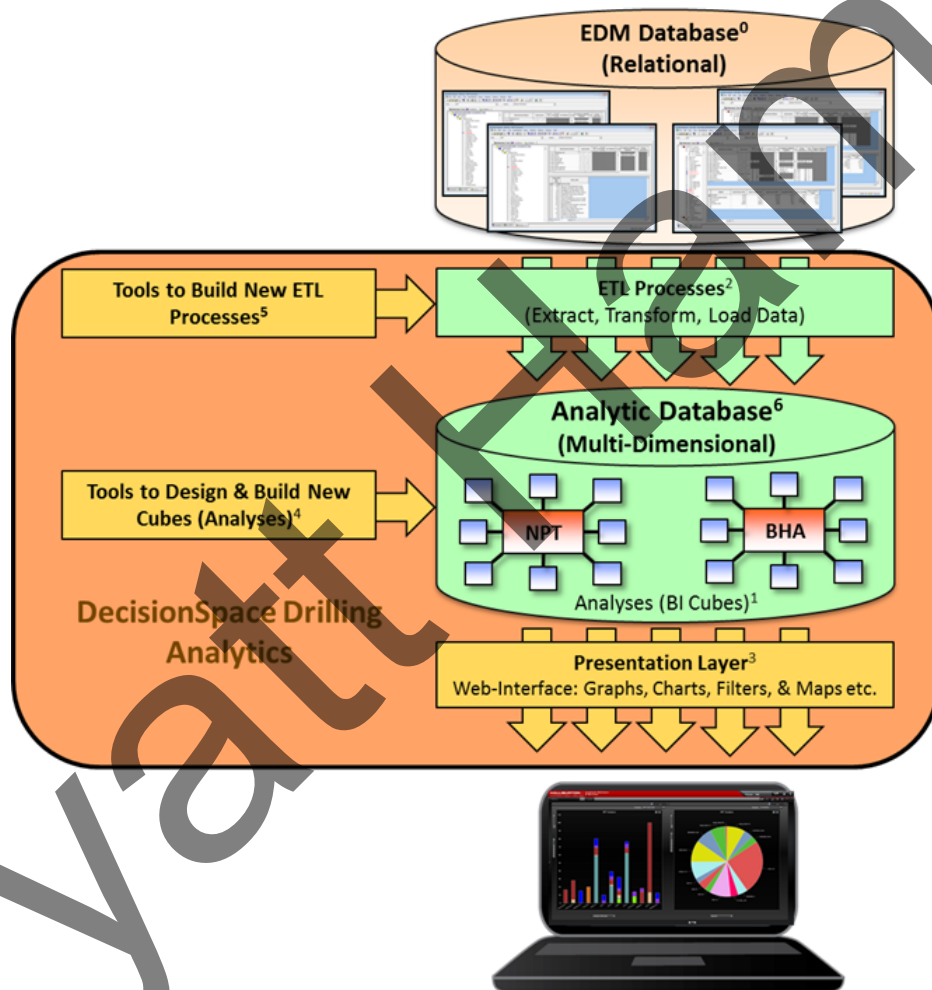
At the core of DSDA sits *Analyses*. Each analysis represents one Business Intelligence (BI) Cube (OLAP Cube) or Multi-Dimensional Data Model or Star schema and so on. These are all just different technical terms for the same thing, that's why we use the simpler term *Analysis*. Each Analysis is made up of different components called *Facts* and *Dimensions*.

At the center of each Analysis are a series of facts (also known as Measures). Facts are numerical values on which basic statistics can be calculated (i.e., mins, maxs, averages, etc.) and are relevant to a decision-making process. There is only one Fact Table in the analytics database for each Analysis. Dimensions are the data on the outside of the mode. There can be multiple Dimension Tables per Analysis.

Multiple Analyses can share the same Dimension Table (provided the primary key in the dimension table is present in the fact table to which you are trying to link the dimension table). Dimensions tables are mostly string values.



The EDM database is a relational database and data is stored in the form of flat inter-related tables. This method is very efficient to store data, but becomes inefficient as you try to mine this information. In DecisionSpace Drilling Analytics we use a third-party ETL (extract transform load) tool to extract the data from the EDM and convert it into analytic database. In an analytic database, data is arranged in the form of multi-dimensional data structures known as cubes and is centered on a single business question. The analytic database is very efficient for data mining. The data that is converted into analytic database is then presented in the presentation layer for analysis.



Examples of Facts and Dimensions from some of our Analyses include the following:

Bit Analysis		
Bit Fact Table	Bit Dimension Table	Well Dimension Table
Avg Torque	Bit Class	Common Well Name
Avg WOB	Manufacturer	Country
Duration	Model	State
ROP	etc.	etc.
etc.		

NPT Analysis		
NPT Fact Table	NPT Dimension Table	Well Dimension Table
Failure Total Cost	Contractor Name	Common Well Name
NPT Net Time	NPT Cause Code	Country
NPT Productive Time Adjustment	NPT Cause Code Description	State
NPT Total Cost Net	etc.	etc.

Log into DecisionSpace® Drilling Analytics Application

Start a supported web browser and access the DecisionSpace Drilling Analytics web page provided by your system administrator. The URL will look like one of the following:

`http://machinename:8084/zalite/GuestLogin`

`http://ipaddress:8084/zalite/GuestLogin`

The DecisionSpace® Drilling Analytics guest login page displays.

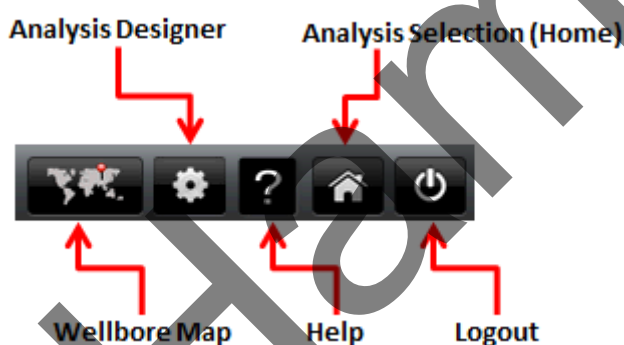


1. To login, enter your Username (in this case is your machine login ID).
2. Select the Analysis you want to work with. Hover over an icon to see a short description. Click the icon to load the Analysis.
3. Use the Working with Charts Workflow to define and manipulate your charts. Export or print plots when finished.
4. Or:
 - Access the Map View to begin filtering wells by location.
 - Access the Analysis Designer to begin editing your Analyses.
 - Perform other administrative tasks (administrator permissions are required for this).

Navigating DecisionSpace® Drilling Analytics Application

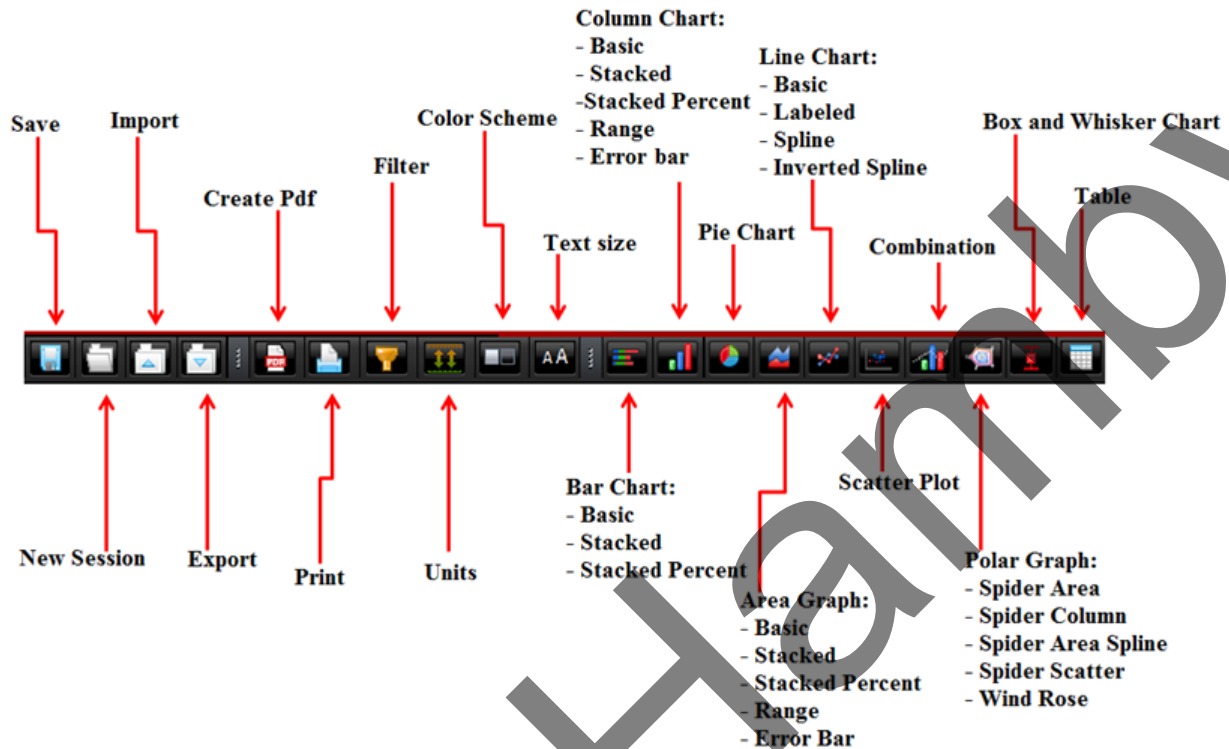
The major DS Drilling Analytics features are described in the following sections. After you log into the DS Drilling Analytics click on any of the pre-defined analysis to see these icons.

Global Controls



Icon	Description
Wellbore Map	In a Wellbore Map, wellbores can be interactively selected using ESRI-based mapping selections and filters. The map interface lets you define search area's geographic boundaries to find wellbores. You can also set up one or more filters to find data based on engineering, geological, or equipment parameters. More information about the wellbore is available via lists and pop-up windows. Hover over a wellbore icon to display information about the wellbore.
Analysis Designer	The Analysis Designer web-based interface is used to: 1) create and edit analyses, or 2) perform administrative tasks. You must have administrative privileges to use the Analysis Designer. Without administrative privileges you will not see the Analysis Designer icon.
Help	The Help command opens the online help document.
Home	The Home command redirects you to the home page from your current page.

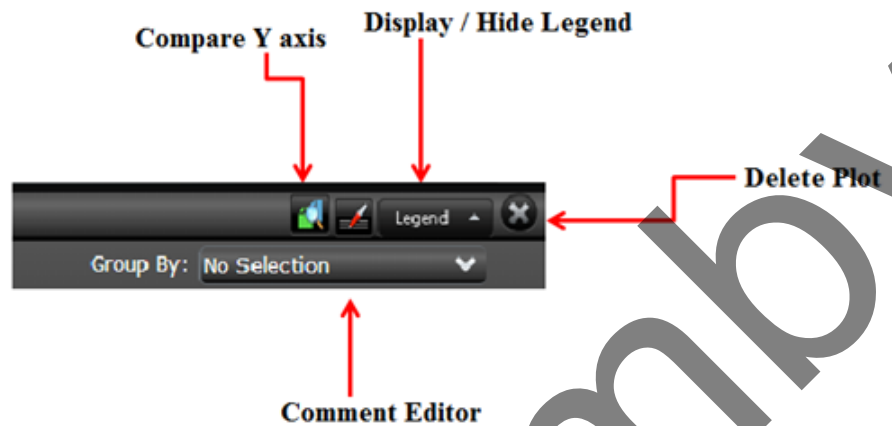
Analysis Panel Controls



Icon	Description
Save	The Save command is used to save the currently selected analysis and its filters. It can be saved as a shared session, which is then accessible to other people or it can be just saved as a session on your local machine.
New Session	The New session command is used to create a new session.
Create Pdf	The Create Pdf command converts the graph you created in DSDA into a PDF and downloads a local copy to your desktop.
Import/Export Sessions	The Import command helps you to import sessions with extension <i>.dsda</i> . The Export command exports the sessions you wish to export with a <i>.dsda</i> extension.
Print	The Print command launches the Windows Print Setup dialog box. Use this dialog box to configure the printers to be used with the DecisionSpace Drilling Analytics application.
Filter	The Filter command applies a filter to the selected graph in the session.
Unit	The Unit command allows you to change the default unit value set during installation. You can select from the list of available unit systems.

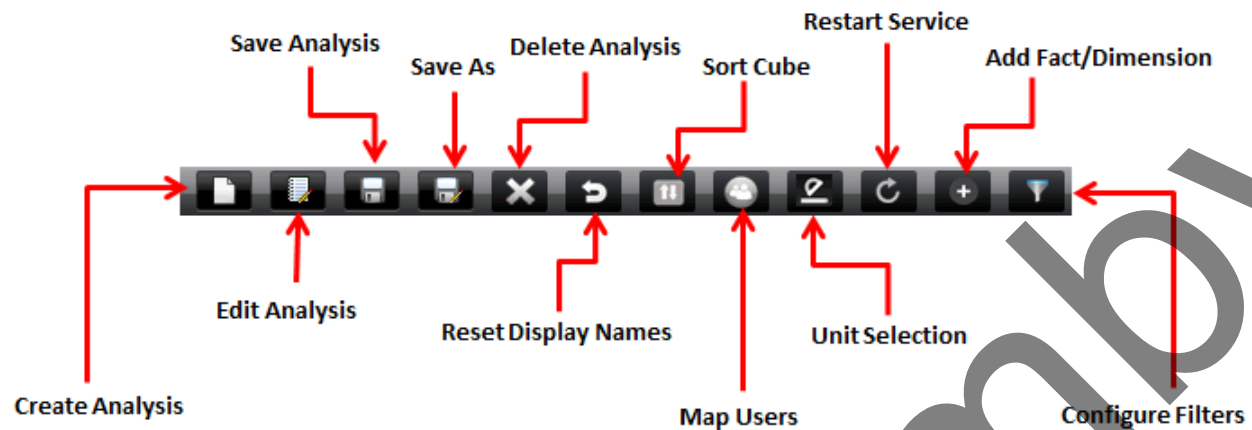
Icon	Description
Color Theme	The Change Theme command changes the theme from black to grey or grey to black.
Text size	The Text size command allows you to change the size of the text. You can increase/decrease the size as you prefer.
Bar Chart	The Bar Chart command displays data using bars whose lengths are proportional to the values they represent. In DecisionSpace Drilling Analytics, bar charts show bars plotted horizontally. Variations: Basic, Stacked, Stacked Percent.
Column Chart	The Column Chart command displays bar charts where the X- and Y-axis are switched (bars run vertical rather than horizontal). Variations: Basic, Stacked, Stacked Percent, Range, Error Bars.
Pie Chart	The Pie Chart command displays data as slices of a circle in which the slices are proportional to the quantity they represent (percentage of the whole).
Area Chart	The Area Chart command displays a line chart in which the area between the line and the baseline is filled with a shading color. Variations: Basic, Stacked, Stacked Percent, Inverted, Spline.
Line Chart	The Line Chart command displays ordered data points (such as measured quantities over time) with a line connecting the sequence. Variations: Basic, Labels, Descending, Spline, Spline Inverted.
Scatter Plot	The Scatter Plot command displays a single point for each data value. Data may be unsorted.
Combination Chart	The Combination Chart command displays two or more chart types in a single chart pane.
Polar Chart	The Polar Chart command displays a circular view of data in which the X-axis is plotted around the perimeter of the circle and the Y-axis runs from the center to the top. Variations: Spider Line, Spider Area, Spider Column, Spider Spline, Spider Area Spline, Spider Scatter, Wind Rose.
Box & Whisker Chart	The Box & Whisker Chart command displays data distribution segmented into quartiles. Box represents the 2nd and 3rd quartile distribution of data. Whiskers extend to show the min and max values in 1st and 4th quartiles.
Table	The Table command displays data values in a row-column spreadsheet format.

Chart Control



Icon	Description
Compare Y Axis	The Compare Y Axis command allows you to make the scale for X and Y axis the same. If more than one attribute is displayed in a chart, this icon normalizes their axes, i.e., it sets their max values to the same number for easy comparison.
Zoom out / Zoom in	The zoom out/zoom in command helps you to zoom in and out of the graph in which you are currently working.
Comment Editor	The Comment Editor command opens a tool to enter comments to store with the chart.
Legend	The Legend command turns the chart's legend on or off.
Delete	The Delete command deletes the chart.

Analysis Designer Controls



Icon	Description
Create Analysis	The Create Analysis command allows you to create a new analysis by using the available fact and dimension tables.
Edit Analysis	The Edit Analysis command allows you to edit the existing analysis.
Save /Save As	The Save command is used to save the currently created analysis or editing analysis. The Save As command is used to save a copy of the currently selected analysis with a new name.
Delete Analysis	The Delete Analysis command deletes the selected analysis from DecisionSpace Drilling Analytics.
Reset Display Names	The Reset Display Names command resets all the customized display names in all available analyses.
Sort Cube	The Sort Cube command allows you to sort the available analyses. This command also helps you hide the analysis from everyone or make it available just to the administrator.
Map User	The Map User command allows you to create a user, map it to the corresponding group, and assign a user or admin role.
Unit Selection	The Unit Selection command displays the list of available units. An administrator can hide the available units as required.
Restart Service	The Restart Service command allows you to restart the service directly from the analysis view.

Icon	Description
Add Fact/Dimension	The Add Fact/Dimension command allows you to add the newly created fact and dimension tables into the Analysis Designer.
Configure Filters	The Configure Filters command allows the administrator to set default filters that can be later used while creating a session.

On the left panel there are number of filters on which you can filter the graphs and charts. These filters are the following:

Filter	Description
Attributes	The fields from the fact table, chosen to be displayed in the analysis you selected, are available when you expand the Attributes bar. You can drill down further on the graph you plotted using these fields.
Dimension Table	Each dimension table used in the analysis will show in the left panel with the group name you provided while adding this dimension table into the analysis designer. The fields from dimension tables, chosen to be displayed in the analysis you selected, are available when you expand each bar. You can drill down further on the graph you plotted using these fields.

Use the Filters and Attributes controls in the left panel to specify or limit the range of data values used to generate charts. As you work with the filters, you may want to manage the appearance of lists using the Filter/Search Options menu.

Summary

In this chapter, you learned how to:

- Navigate the DecisionSpace® Drilling Analytics application
- Identify the different components

Chapter **3**
Exercises

Wyatt Hamby

Exercise 1 - Add/Remove Fields from Existing Analyses

You will extract many more fields from the EDM than you actually expose in DSDA. Exposing every single potential data point would quickly make DSDA unmanageable, and the application should be as easy-to-use as possible. It is relatively simple to expose these additional fields in DSDA. This is different from adding new data that you have not extracted from the EDM; that has to be added separately and you will do that in a separate exercise.

Purpose: To familiarize users with the DS Drilling Analytics application

In this exercise, you will:

- Launch the DS Drilling Analytics application
- Add or remove fields from the existing analysis

Getting Started

1. Log into the DecisionSpace Drilling Analytics application by opening a web browser and navigating to the following URL:

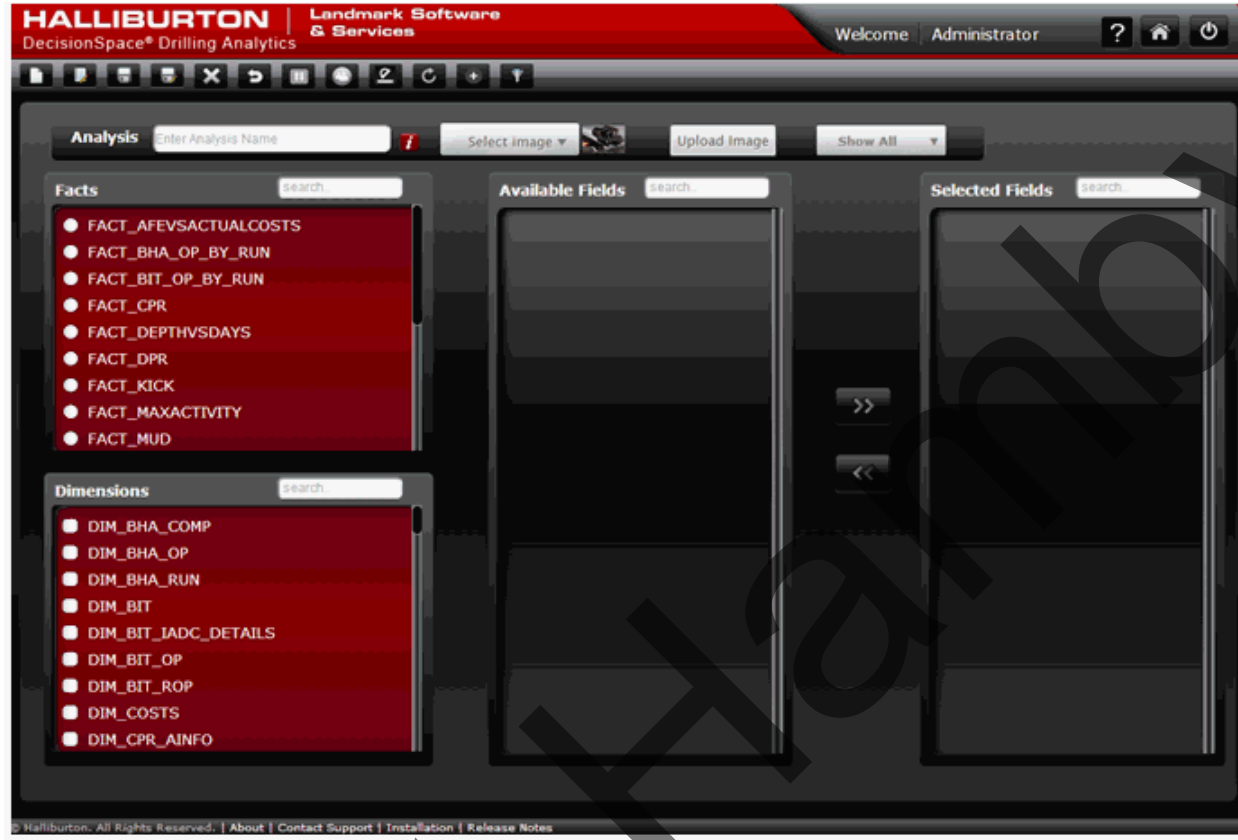
`http://localhost:8084/zalite/GuestLogin`

2. Click the **Analysis Designer** icon. (The cog or gear at the top right corner) .

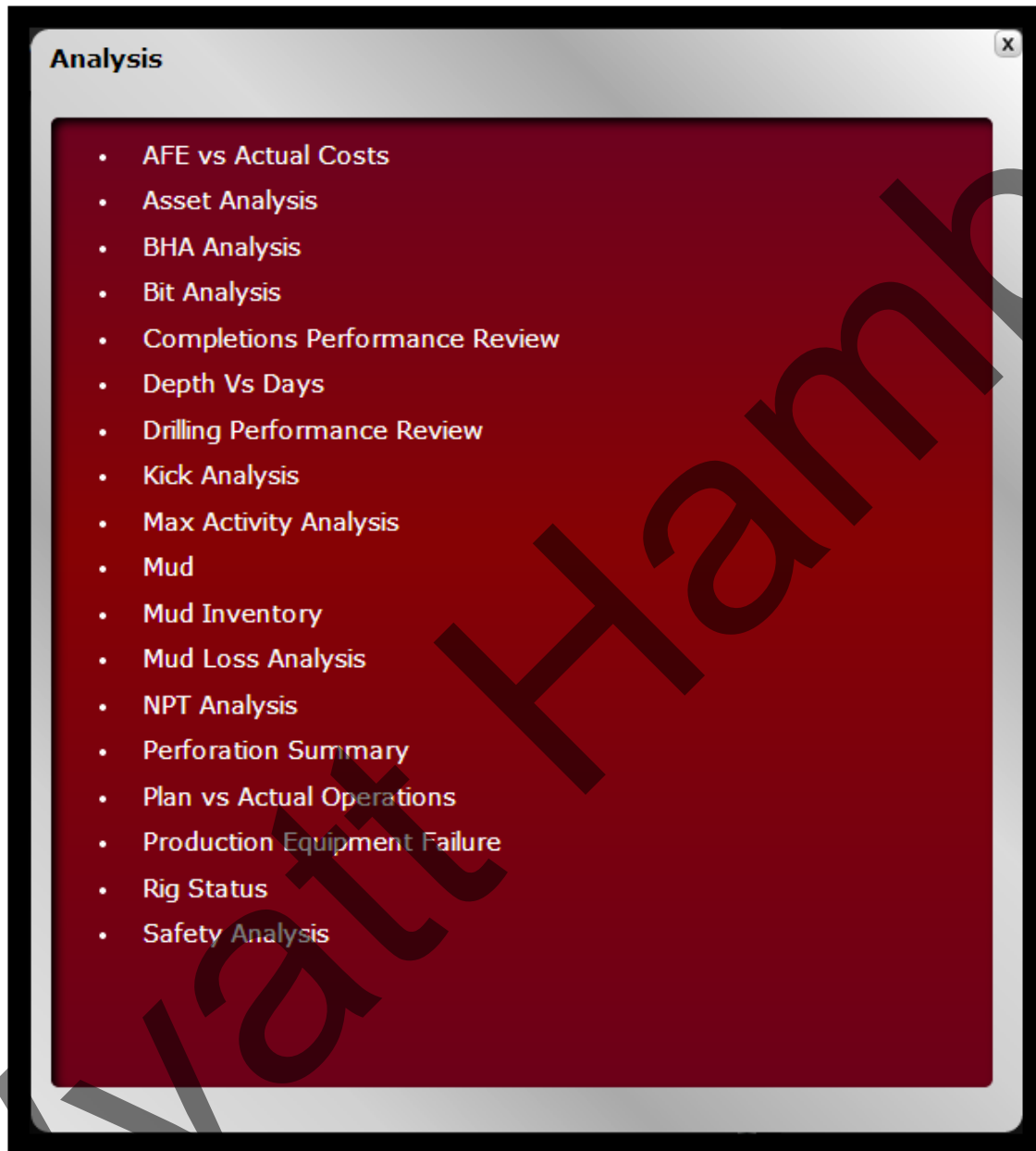
Note

If you do not see this icon, you do not have Administrator privileges. Ask your system administrator to provide you access.

DecisionSpace Drilling Analytics opens.



3. Click the **Edit Analysis** icon . A list of all current Analyses displays.



For this exercise, you will modify Safety Analysis.

4. In the Analysis list, select **Safety Analysis**.

- Take a moment to understand the available and currently displayed data.

In the Analysis Designer, the Facts panel (top left) lists all the current Fact tables in the analytical database. You can add new Fact tables, which you will do in a later exercise. The Dimensions panel (bottom left) lists all the current Dimensions tables in the analytical database. The center panel shows Available Fields and the right panel shows Selected Fields.

You pull a lot of data from the EDM to use in your tables, but, by default, not all data is displayed. This is generally true for all the Facts and Dimensions tables for each Analyses. If there is a related field in the EDM that you do not see in your analysis, you should be able to find it in the analytical database using the Analysis Designer. The next steps show how to expose additional fields.

First, you will add and remove Fact fields. For this example, you will look at fatalities and cost which are not displayed by default.

Fact Tables

Dimension Tables

List of fields in the selected Fact or Dimension table that are not currently displayed

List of fields in the selected Fact or Dimension table that are currently displayed

- Select **FACT_SAFETY** from the Facts panel.

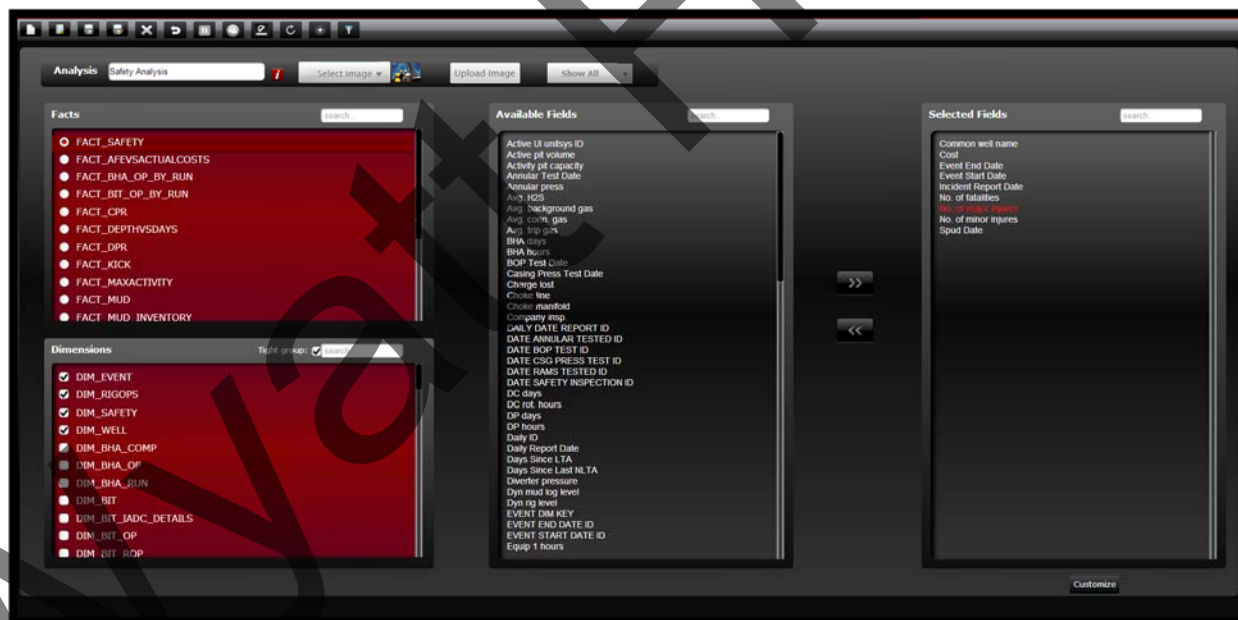
7. Select **No. of fatalities** and **Cost** from the Available Fields panel, and then click the double-right arrow to move the selections to the Selected Fields panel.

You can also remove fields that are not typically populated in OpenWells because they will always be empty.

8. Select unwanted fields in the Selected Fields panel, and then click the double-left arrow to move them to the Available Fields panel.

You can remove everything except:

- Common Well Name
- Cost
- Event End Date
- Event Start Date
- Incident Report Date
- Major Injury Count
- Minor Injury Count
- No. of fatalities
- Spud Date



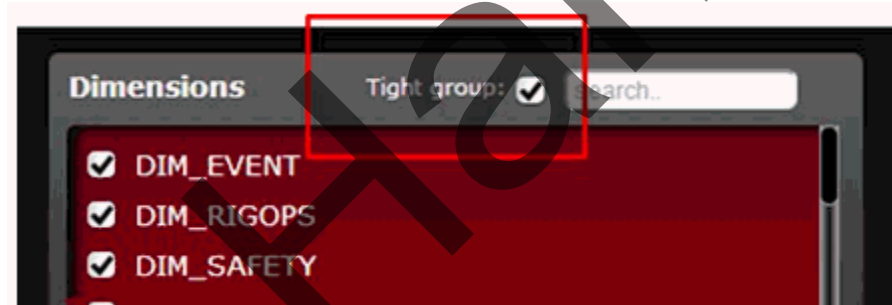
You will now add and remove dimension fields.

9. Select **DIM_RIGOPS** in the Dimension panel.
10. Select **Owner/Contractor** from the Available Fields panel and add it to the Selected Fields panel.

11. Select other dimensions to see what other fields can be added or removed.
12. Enable EDM Tight Group security, if desired.

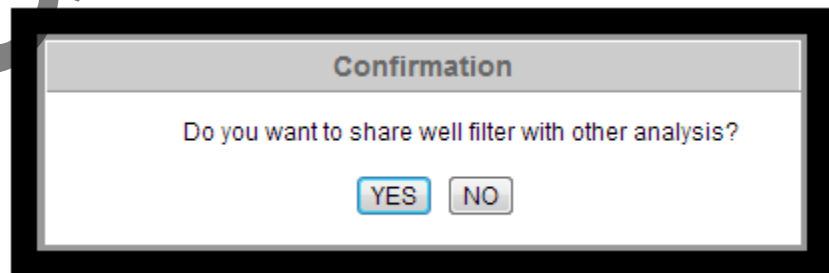
Note

If you select the Tight Group checkbox in the Analysis Designer, the product will check the EDM permissions of every user who tries to use the Analysis. If a user does not have an EDM_USER_NAME assigned in the User Mappings dialog box, they cannot access the Analysis. If they have an EDM_USER_NAME assigned, they will see only the subset of EDM data that their Tight Group settings allow. If you are building an Analysis from data sources other than EDM, leave Tight Groups unchecked.



13. Click the **Save** icon.

You will be asked to confirm whether you want to share the well filter with other Analyses. If you select Yes, when you filter by Common Well Name in the Safety Analysis, for example, and then select a different Analysis, the filter is carried over to that Analysis.



14. Click **Yes**.

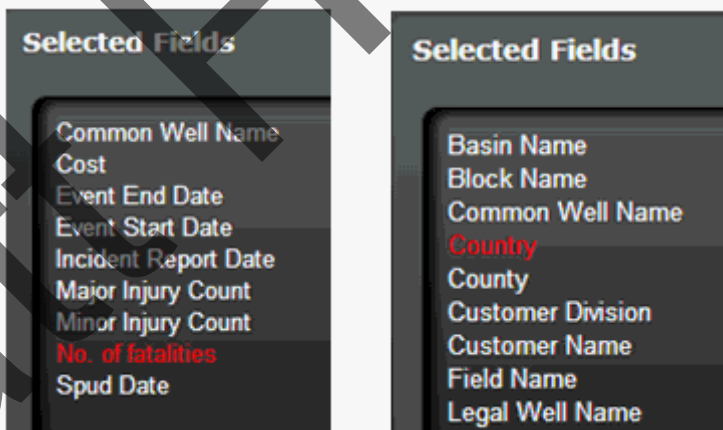
To see the updated Analysis, you have to restart the services, but you will make some more changes before restarting the services.



Set Default Facts and Dimensions

You must set a default Fact and Dimension which will be used when you display a graph/chart. One Fact and one Dimension need to be selected. Double-click a Fact/Dimension to make it the default. It will turn red to indicate it is the default Fact/Dimension.

1. Double-click **No. of fatalities** for FACT_SAFETY.
2. Double-click **Country** for DIM_WELL.



3. Click the **Save** icon.

Note

No changes take effect until services restart. If you want to make additional changes to the Analysis, do so before restarting the service. Click the Restart Service button after when finished making changes to the Analysis.